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Who are the New Users of Antipsychotic Medications?

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Abstract

Objective—to examine changes in the prevalence of antipsychotic medication use and the characteristics of antipsychotic users in the US population.

Methods—We use data from the Medical Expenditure Panel Survey from 1996/97 and 2004/05 to examine the rate of first and second-generation antipsychotic medication use and changes in the characteristics of users of all ages. We examine trends in the level of use by antipsychotic users both in terms of daily dose units and number of prescriptions.

Results—The rate of antipsychotic use has increased substantially between 1996/97 and 2004/05, but the average dose measured both by daily dose units and number of prescriptions has remained constant. The rapid diffusion of antipsychotic medications occurred not among individuals with schizophrenia, but rather includes substantial growth in off-label users and newer on-label conditions. Demographic, financial, and insurance characteristics of users have remained fairly constant, with few exceptions. The average age of antipsychotic users has declined from 1996–2005 as more children are using these medications. The gender, racial, ethnic, and insurance composition of users has been fairly stable over time, however.

Conclusions—The rapid diffusion of second-generation antipsychotic medications was achieved by large increases in the rate of use in certain subpopulations, most notably children. Increasing understanding of the marginal efficacy and side-effect risks of newer and more expensive antipsychotic agents, even when prescribed as indicated, suggests that the dramatic increase in use warrants careful attention.

Introduction

Second-generation antipsychotics have diffused rapidly among antipsychotic medication users and have generally been regarded as a first-line treatment for schizophrenia (1–4). Additional FDA indications for use in bipolar and significant levels of off-label use and use in children have increased the rate of antipsychotic medication use (5—8). Antipsychotics have greater off-label use than do many other therapeutic classes and these uses may not be well-supported by scientific evidence (9).

While spending on psychotropic medications is increasing at a higher annual rate than is spending on other medications (17.1% vs. 12.1%) (10–11). psychotropic drugs may still be underused in mental health care (12) due to barriers to treatment such as cost and stigma. Increases in antipsychotic medication use are justifiable if the population with conditions appropriately treated with antipsychotics, such as schizophrenia and bipolar disorder are under-treated, and if antipsychotic medication treatment is cost-effective (13) compared with other

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alternatives. This implies that second-generation antipsychotics may not have to "pay for themselves" in terms of providing an offset in lower total health care costs (14), but should provide greater benefits per dollar spent than older less expensive antipsychotics or other treatments.

Although there is significant variation in the benefit from drug products across individuals (15), in theory drugs that provide greater value should diffuse much more quickly than other drugs. However, this is not always the case. Treatment decisions are made under a veil of uncertainty and market imperfections, and are subject to a host of influences on prescribers: prescribers are never sure *a priori* which products will work best for any individual and information on side effects is often recognized over time (as has been the case with significant product withdrawals such as Vioxx). Diffusion of specific medications into treatment can be improved with a larger evidence base (16) on which to examine whether the growth of particular products is indeed rational.

The CATIE trial was an effort to examine whether the rapid diffusion of second-generation antipsychotics is well informed by examining the effectiveness and tolerability of four second and a single proxy for first-generation antipsychotics (17). The CATIE cost-effectiveness analysis (1) found that while the outcomes expressed in Quality-Adjusted Life Year units were similar across all five drugs, the total health care costs for those randomized to the first-generation antipsychotic, perphenazine, were substantially lower than for the second-generation antipsychotics. A recent study in the UK comparing first versus second-generation antipsychotics in a sample of previously-treated individuals with schizophrenia found lower costs and better outcomes in the older medications (18). These results may indicate that the widespread use of second-generation antipsychotics over first-generation alternatives may not be the best use of limited resources.

While the diffusion of second-generation antipsychotics has been described in the literature (2,3,12), the method by which these gains have been achieved has not been explored. There are two primary means of achieving market growth for pharmaceutical products: increases in the number of medication users or increases in dose per user; these two mechanisms are not mutually exclusive. It is unknown which is driving the current growth in antipsychotic medications, although one recent study using MEPS data notes that just over a third of the increase in the larger class of psychotropic medication was due to new users whereas two-thirds of the increase was due to greater spending per user (6). In addition, much of our knowledge about antipsychotic medication use comes from Medicaid populations (2,19) with little information available on trends in the use of antipsychotics from privately insured and uninsured populations.

This manuscript seeks to fill these gaps in the literature by examining the prevalence of antipsychotic medication use in the general population and the characteristics of antipsychotic users, including the rate of second-generation antipsychotic use and the level of use per user.

Methods

We use data from the Medical Expenditure Panel Survey (MEPS) from 1996 to 2005 to examine the characteristics of users in each time period as well as the rate of use in key subpopulations. The MEPS is a rich overlapping panel dataset with a randomly selected annual sample of approximately 23,000–35,000 non-institutionalized US civilians and detailed information on health care services used in each survey year, insurance coverage, and expenditures by source (20). Response rates ranged from 60–70% for the annual cohorts examined here and survey weights were adjusted for non-response (21), reducing selection bias. Clinical and expenditure

information is available in MEPS both from household respondents and from provider and pharmacy follow-back surveys. Both children and adults were included in the analysis.

The study years were selected by necessity from those available in the MEPS: 1996 is the earliest year available and 2005 is the most recent as of the writing of this manuscript. Because of the relatively small sample size of antipsychotic users, we pool adjacent years for this analysis and compare 1996–1997 to 2004–2005 (22–23). Thus means and proportions represent averages across each two-year period. 1996/97 is early in the diffusion path of second generation agents and therefore an interesting comparator to the 2004/05 period when these agents were widely used. Clozapine was approved by the FDA for the treatment of schizophrenia in 1989, Risperidone in 1993, Olanzapine in 1996, and Quetipine in 1997; other second generation agents and newer approved indications for existing agents followed in the 2000s. Because relatively small subsamples remain for some analyses, we indicate cell sizes relying on unweighted samples of less than 100 respondents (23) and urge caution in interpreting estimates based on small cell sizes. We retain the estimates in these cells for descriptive purposes only and do not conduct statistical tests against cells with fewer than 50 observations.

The prevalence of antipsychotic medication use was estimated from the MEPS prescription drug files in each year. Antipsychotic medications were identified via the Multum Lexicon categories appended by MEPS staff to each prescription (24). Modifications to this system were made, for example, excluding lithium, chlordiazapoxide, and prochlorperazine prescriptions from the Multum antipsychotic category.

Prescriptions were converted to defined daily dose (DDD) units in order to calculate quantity of use across formulations. The DDD system is promoted by the World Health Organization (http://www.whocc.no/atcddd/) and allows the quantity of medications received to be expressed in terms of the number of days' supply of medication received on a standardized maintenance dose (Appendix Table 1); these standardized doses were within the ranges specified in the CATIE protocol (17). The conversion to DDD was applied to all antipsychotic prescriptions regardless of target condition or age of the patient. While the maintenance dose may not be the appropriate dose of medication for some antipsychotic users (e.g., those initiating therapy, children and elderly patients, off-label users), it does provide a way of examining average dosing over time across antipsychotic regimens. Increases in average DDDs per user may be due to actual dose increases or to polypharmacy since doses are added up across formulations for each user. In contrast, decreases in average DDDs may be due to expansions to populations which may have lower target dosing (children, elderly) as well as increases in off-label use.

Other characteristics reported were obtained from the MEPS household survey (20) for each year for antipsychotic users only. The reported characteristics focus on exogenous factors that describe the population of antipsychotic users so as to avoid providing outcome data that may be influenced by choice of antipsychotic agent. We do, however, report antipsychotic and total health care expenditures and insurance variables, noting that these measures may be a function of treatment selection. Other characteristics examined include age, especially use in children (under age 18), the elderly (age 65 and over), payor status, employment status, and the number of other medication classes used. All spending estimates are presented in 2005 dollars, having been deflated by the GDP deflator. Complex sampling weights and variances appropriate for the pooled analysis (22) were used to obtain nationally representative estimates; differences across years were examined with t- and chi-square tests. All analyses were conducted in Stata 10 using *svy* commands to adjust for the complex survey design of MEPS. Linearized standard errors are reported in the tables.

The issue of off-label prescribing of antipsychotics is only partially addressed in the present analysis. Medical conditions available in the Household Component of the MEPS are by self-report only and are available in the public release version of MEPS as collapsed 3-digit ICD-9 codes to protect respondent confidentiality. Conditions are reported in the MEPS both in a separate section on medical conditions and injuries and from all reports of health services and medications used. We identify individuals who self-report any condition in the ICD-9 categories for on-label use, namely schizophrenic disorders (295) or bipolar disorder, which is a subset of the larger ICD-9 category of affective disorders (296). Because unipolar major depression is also classified in 296, we are unable to separate off-label use in depression from on-label use in bipolar disorder due to the unavailability of the fourth digit of the ICD-9 code and therefore will over-count on-label use. Our use of the terms on and off-label relies on these collapsed 3-digit self-reported medical conditions and should be interpreted accordingly. We also examine changes in other reported off-label uses of antipsychotics (25) for anxiety-spectrum disorders (300) including obsessive-compulsive disorders; this category does not include other common anxiety disorders. We are unable to evaluate other off-label conditions that have been noted in the literature due to inadequate sample sizes in all years. Because of the potential for comorbidity among these three conditions, we indicate 296-affective disorders only among those without reported schizophrenia, and anxiety-spectrum disorders only among those without either schizophrenia or 296-affective disorders. The reliance on self-reported conditions will potentially undercount each of these related conditions, while the use of collapsed 3-digit ICD-9 categories will overcount the more narrowly identified disease areas; the net effect is ambiguous. Our use of code groupings is not all-inclusive and was intended to identify major diagnostic categories for which antipsychotics might be used. There is no reason to believe that the population rate of under-reporting or of actual disease prevalence has changed over the study period (26).

Finally, we examine whether the characteristics that predict antipsychotic use and second-generation use among antipsychotic users have changed over time through a weighted linear probability model regression analysis, using demographics, insurance status, year indicators, and interactions of these factors and year indicators. We run this regression separately for adults and children, and adjust standard errors for heteroskedasticity and clustering.

Results

Second-generation antipsychotics have diffused rapidly between 1996–2005. In 2004/05, 1.17% of the non-institutionalized US population filled prescriptions for antipsychotic medications, up from 0.72% in 1996/97 ($p<0.01$; Table 1).

The population prevalence of second-generation use increased almost 7-fold in eight years, with 0.15% of the population using second-generation antipsychotics in 1996/97 to 1.06% in 2004/05. The use of first-generation agents dropped during this period from 0.60% to 0.15% of the US population.

While the size of the antipsychotic market has increased, the characteristics of users have remained fairly constant, with some exceptions. Notably, the average age of antipsychotic users has declined, from 49 years of age to 43 ($p<0.01$). This age reduction resulted from a shift in the distribution of users from elderly users towards children (Figure 1). The percentage of the user population accounted for by children has doubled for this 8-year period, from 7% to 15% of all users ($p<0.01$). This increase in antipsychotic use by children can also be seen by a more than tripling of the rate of antipsychotic use from 0.2% to 0.7% in children (Figure 2). Elderly users have declined from 23% of all users to 14%, but experienced no change in the rate of use. The rate of use in non-elderly adults also increased from 0.8% to 1.3%, although they remained a constant 67–69% of antipsychotic users. The gender, racial, and ethnic composition

of users has been fairly stable over time, with women comparison a slight majority of users (55%) and whites accounting for 76–81% of users.

The insurance status of antipsychotic users also remained fairly constant over this time period. While Medicaid is thought to dominate payments in this market, only 46–47% of outpatient antipsychotic users had Medicaid coverage in the year. Antipsychotic users were almost as likely to be covered by private insurance, with 41–42% of the population of users covered by private plans during the calendar year. The labor market participation of individuals remained fairly constant at 30–32% and the percent of users with household incomes less than 200% of the poverty level at 55% to 58%.

The data show a remarkable shift in the related on and off-label diagnoses for antipsychotic users (Figure 1 & Figure 3). Across years, 14–19% of users reported having a schizophrenia disorder and those with this disorder reported a stable level of antipsychotic use (86–90%). However, the percent of users with a 296-affective disorder without comorbid schizophrenia increased substantially from 8% of all users to 22% of all users ($p<0.01$) and the rate of use for individuals in this category increased from 18% to 35%. The reported prevalence of anxiety-spectrum disorders without on-label comorbidities among antipsychotic users was constant at 18%–19%, and the rate of antipsychotic use in this category remained constant at 5%. The self-reported prevalence of anxiety spectrum in the ICD-9 code class 300 only in the full U.S. population doubled from 2.4% to 4.8% ($p<0.01$).

The average dosing of antipsychotics among users, expressed in daily dose units, remained fairly constant across this time period, ranging from 144 daily doses per user in 1996/97 to 115 daily doses per user in 2004/05. The average number of antipsychotic prescriptions per user remained constant, at about 7 per year. The average antipsychotic user received a greater number of other medications, increasing from 3.3 in 1996/97 to 4.1 in 2004/05 ($p<0.05$).

While spending on antipsychotic medication in non-institutional settings prior to applicable discounts has clearly increased over this period, starting as a $1.1 billion market in 1996/97 (in 2004–05 dollars) and currently over $4.6 billion per year in 2004/05, the payor composition has remained stable. Individuals and their families are the largest source of payments for antipsychotics, paying for 37–41% of the total market whereas Medicaid paid for just over a third (35–36%). Private insurance payments accounted for about one-fifth (18–22%) of the outpatient antipsychotic market.

We find no difference across racial and ethnic categories in the probability of using antipsychotic medication after controlling for covariates among adults. Adults with self-reported schizophrenia, 296-affective disorders, or anxiety-spectrum disorders were more likely to use antipsychotics than were those without these conditions. Having a 296-affective disorder without comorbid schizophrenia was 14 percentage-points more likely to lead to an antipsychotic prescription in 2004/05 than in 1996/97 ($p=0.01$). No other condition or characteristic was associated with greater use in 2004/05. Among children, girls, African Americans, and Latinos were less likely to use antipsychotics in all study years ($p<0.05$), but the differences were small. Both schizophrenia and anxiety spectrum disorders and not 296-affective disorders increased the probability of childhood antipsychotic use in 2004/05 over 1996/97.

Individuals receiving antipsychotic medications were 68 percentage-points more likely to receive a second-generation antipsychotic in 2004/05 than in 1996/97. Respondents with income under 200% of the Federal poverty level were more likely to receive a newer antipsychotic in 1996/97 than those with higher income, controlling for self-reported conditions and other covariates, but less likely to receive an atypical antipsychotic in 2004/05. This suggests that low-income patients (or their doctors) were early adopters and that the other

users caught up in 2004/5. No other differences in predictors of second-generation use were significant at the 95% level between sample periods (full results available from author by request).

Discussion and Conclusions

Despite a fairly constant rate of individuals in the US with mental illness (26), there have been notable shifts in the population of non-institutionalized US civilians using antipsychotic medications. We found substantial increases in the number of individuals filling antipsychotic prescriptions in the general US population, but no increase in the level of use among antipsychotic users since the mid-1990s, measured by both daily dose units and by the number of prescriptions.

The relatively constant rate of use among individuals who self-report schizophrenia indicates that the rapid diffusion of second-generation antipsychotics was not associated with a greater rate of treatment in this population. Rates of antipsychotic use among those reporting schizophrenia were stable across years and no difference was found in reporting rates across years ($p=0.685$), although rates are lower than in other studies (27). The expansion of the antipsychotic market, instead, occurred among other disease categories, such as those with 296-affective disorders.

The fact that the increased use of second-generation antipsychotics was not accompanied by a higher dosing is surprising and may mask several competing trends. Second-generation antipsychotics were originally touted as less-toxic alternatives to first-generation agents (28–30), which, if true, should have increased the level of use. However, during the sample period, more information became available on the negative health effects of some second-generation antipsychotic medications, leading the FDA in 2003 to issue a warning regarding the risk of hyperglycemia and diabetes mellitus based on several studies which were published during our study period (31). In addition, the remarkable increases in the rates of use for off-label conditions and use in children (5,19,25,32,33) may lead to lower dosing.

The data examined here largely predate the CATIE results, but the question remains: why did second-generation antipsychotics diffuse so rapidly? The answer is complex, and is likely a function of factors not examined here, such as provider and patient expectations and preferences, drug company marketing effects (12,13) and the dominance of industry-funded trials in the early second-generation antipsychotic efficacy literature (28–30). In addition, clinical and malpractice risk concerns about the higher rate of tardive dyskinesia associated with first-generation vs. second-generation antipsychotics also drove diffusion. The trends here mimic the rapid diffusion of the newer antidepressant medication, especially among children (34).

It is clear that the appropriate use of antipsychotic medications improve the quality of life for people with schizophrenia and related disorders (12), but recent evidence from the CATIE and other studies (35–37) has brought into question whether the more expensive second-generation antipsychotics are really a better use of resources compared to first-generation antipsychotics. The lower risk of tardive dyskinesia may be one area in which second-generation antipsychotics have an advantage of first-generation antipsychotics, although this is recently been questioned (35) and may be overshadowed by the greater risk of diabetes, obesity, and other related conditions (4); many of these risks were disclosed during our study period (38). Second-generation antipsychotics will only increase in use as they begin to come off patent, opening the market for less expensive generic substitutes, and triggering a wave of less restrictive policies, especially in Medicaid and Medicare Part D formularies.

The greater use of antipsychotics in pediatric populations is consistent with other work (5) and is an important policy issue. Antipsychotics are used in childhood disorders other than schizophrenia, such as autism and disruptive behavior disorders, but little is known about their efficacy and long-term effects and differences in the types and intensity of side effects have been noted (5,7,8).

A number of limitations should be noted for this analysis. The MEPS does not survey institutionalized individuals, who may have different patterns of antipsychotic use. Therefore the size of the full antipsychotic market and specifically the amount paid by Medicaid are understated in this study. Several of the cells for 1996/97 are based on fewer than 100 observations and may be less reliable; they are presented for descriptive purposes only but this in itself is a telling indicator of the rates of use in these subpopulations in the earlier time period. The self-reported medical conditions are not as accurate as clinician diagnoses and clearly understate the prevalence of disease in the population. For example, Wu and colleagues (39) estimate a 12-month prevalence of schizophrenia of 0.51% using a variety of claims data sources, whereas the MEPS reported prevalence is 0.16–0.18%. In addition, the on-label rates reported here, ranging from 27.5% in 1996/97 to 35.8% in 2004/5, are likely too low, although the inclusion of all 296 affective disorders as on-label underestimates off-label use. Other rates reported in the literature use claims diagnoses and are slightly higher, ranging from 36% in Georgia Medicaid in 2001 (39) to 44% of second-generation antipsychotic use in 2004 (40); Radley and colleagues report an off-label rate of 31% for the broader psychotropic category (9). The conversion to daily dose units are based on current dosing guidelines and do not vary over the study period. We do, however, find consistent results whether we look at the annual number of daily doses or the number of antipsychotic prescriptions.

While literature from the CATIE study has increased the knowledge base surrounding the use of antipsychotic medications, there are a number of issues that remain to be examined. As with most clinical trials, the population studied in CATIE may not resemble the full spectrum of medication users (13). In particular, users with schizophrenia and Alzheimer's represent a small fraction (<20%) of all antipsychotic users. Further information on the cost-effectiveness of antipsychotic use in these non-traditional but increasingly common categories of use would inform the diffusion process. Finally, while CATIE itself may affect antipsychotic diffusion, early results in a privately insured population found no effect of CATIE on antipsychotic use (41). Inferences from CATIE were complicated by the introduction of Medicare Part D shortly after the initial CATIE results were released; Part D itself will also substantially affect the use of antipsychotic medications as Medicaid funding and associated restrictions on medication use for dually-eligible Medicare beneficiaries shifted to the Medicare program (42). If prescribers become willing to return to the earlier technology of first-generation antipsychotics as the CATIE message is repeated, we may see a substantially different diffusion process over the next decade.

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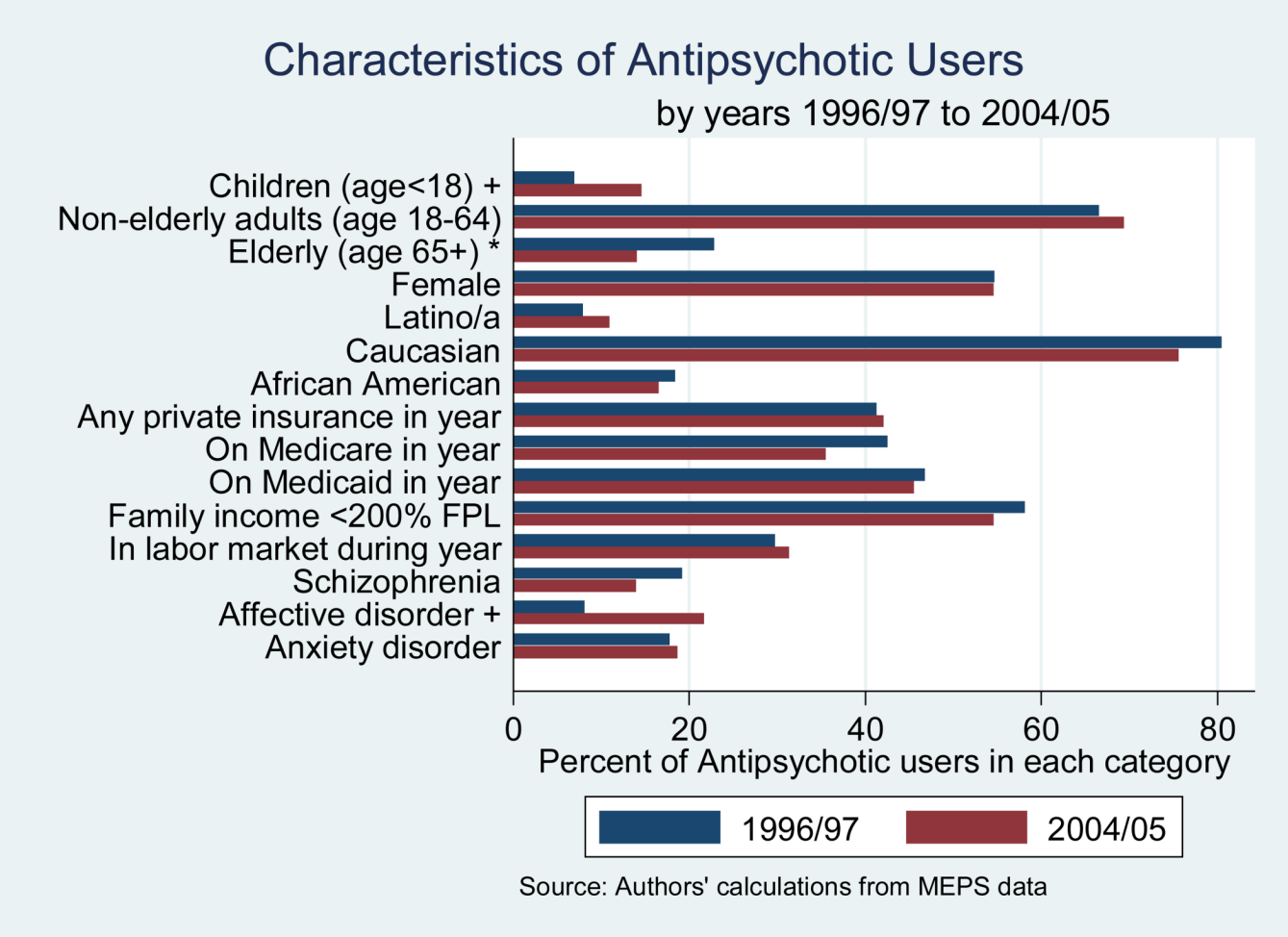


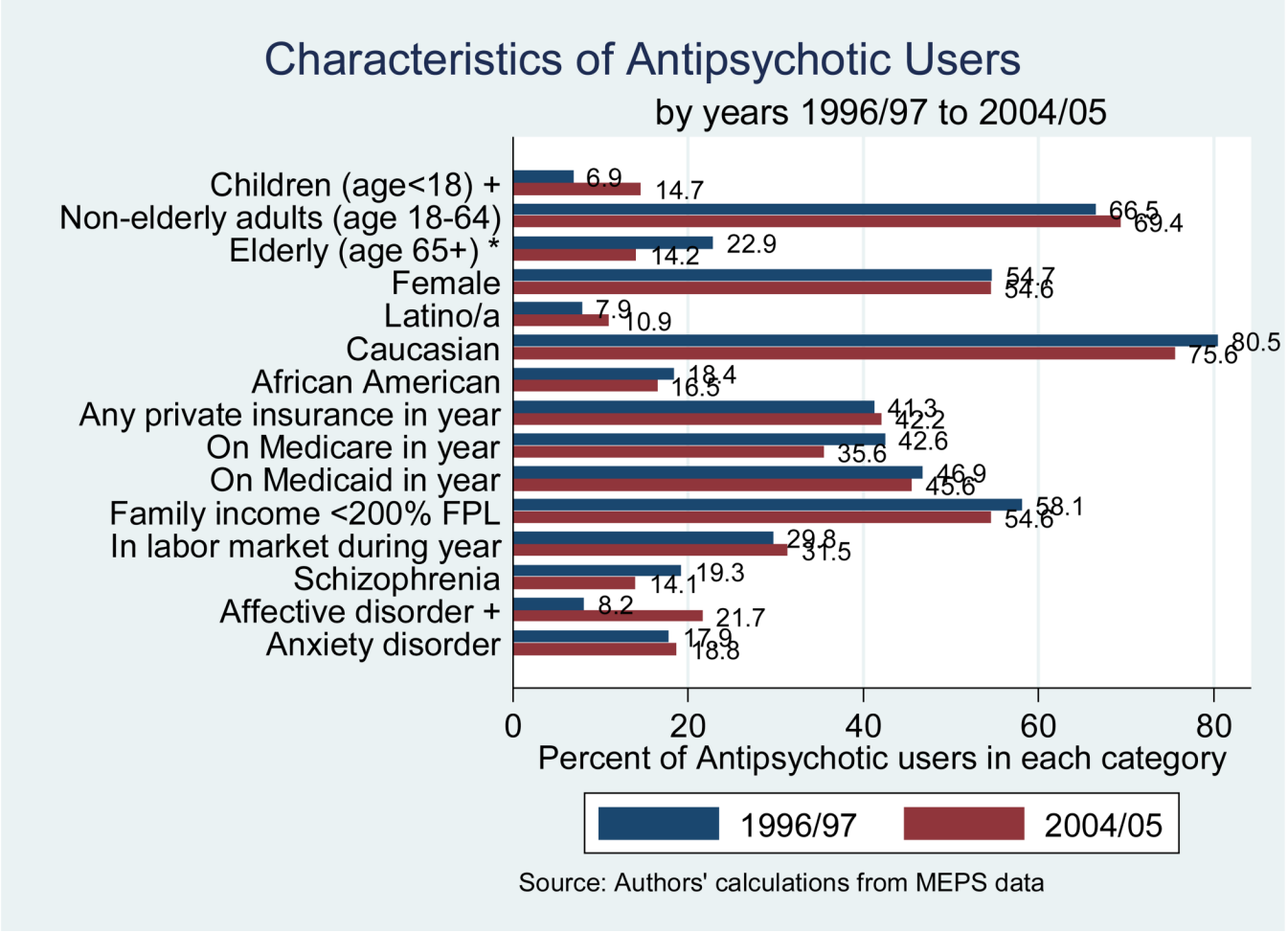
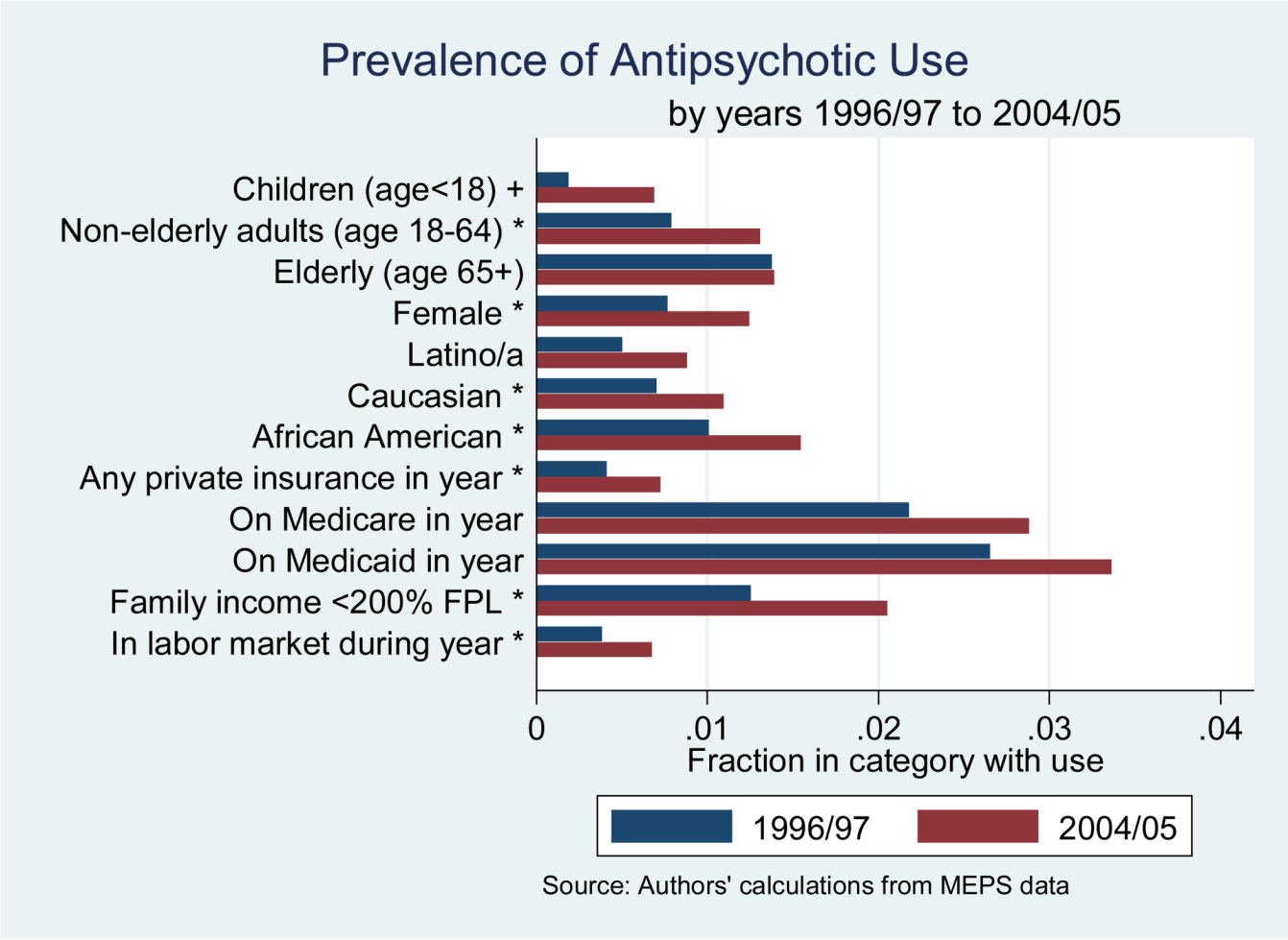


Figure 1.

FPL=Federal Poverty Level. In 2006–7, multiple racial categories were allowed; in these years white and black both indicate no other categories were recorded. Affective disorder includes only those disorders coded in the ICD-9 category of 296 and excludes individuals with comorbid schizophrenia. Anxiety spectrum disorders exclude individuals with comorbid schizophrenia or 296-affective disorders. Some cell sizes for 1996/97 are smaller than 100 observations as noted in Appendix Table 1. * chi-square tests for discrete variables were significant at $p<0.01$. + comparisons are descriptive only due to small cell sizes in 1996/97.



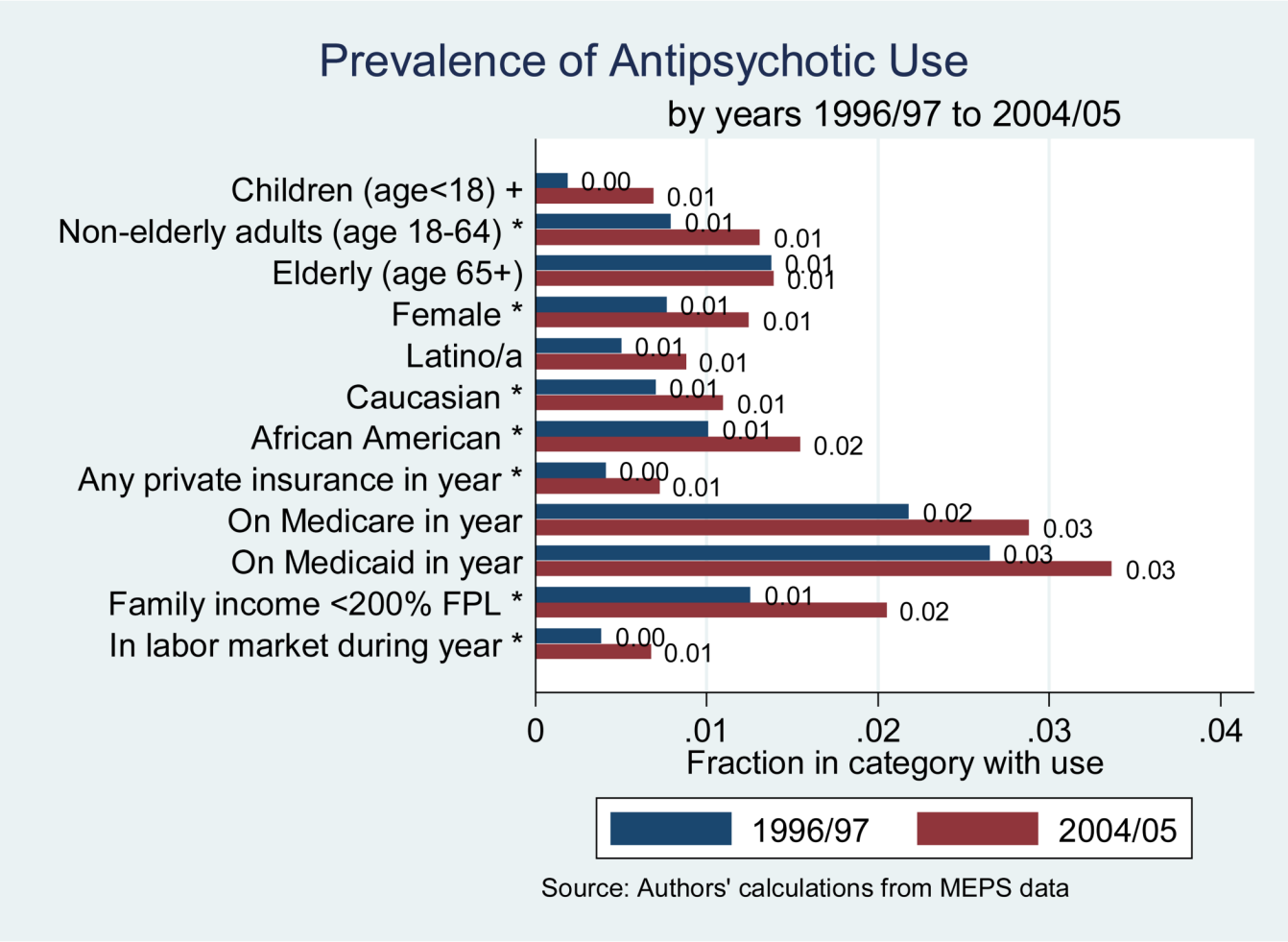


Figure 2. Prevalence of Antipsychotic Use by Characteristics

FPL=Federal Poverty Level. In 2006–7, multiple racial categories were allowed; in these years white and black both indicate no other categories were recorded. Some cell sizes for 1996/97 are smaller than 100 observations as noted in Appendix Table 2. * chi-square tests for discrete variables were significant at p<0.01. + comparisons are descriptive only due to small cell sizes in 1996/97.

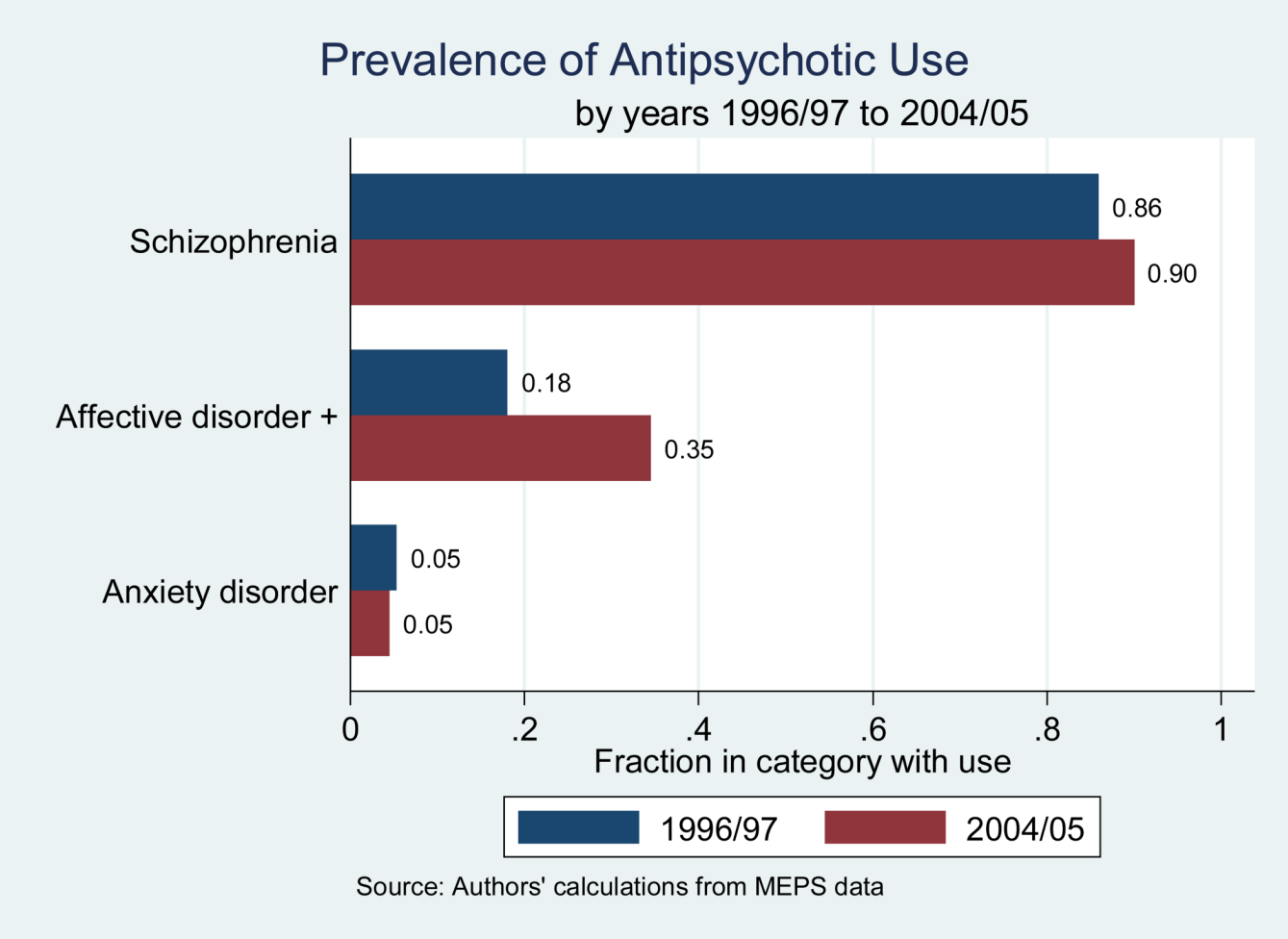


Figure 3. Prevalence of Antipsychotic Use by Self-reported Psychiatric Condition

Note: conditions are reported by survey respondents and are not clinical diagnoses. Affective disorders include only those in the 296 ICD-9 category and exclude those individuals who report schizophrenia (295) in the same survey year. Similarly, anxiety spectrum disorders include only conditions in the ICD-9 category of 300 and exclude those individuals who report either schizophrenia or 296 affective disorders.

Table 1

US Population characteristics on antipsychotic users

Variable	1996–97		2004–5	
	Percent	Linearized Standard Error	Percent	Linearized Standard Error
Percent of US population with any antipsychotic use	0.72% **	0.06	1.17%	0.07
Percent with any use of first-generation antipsychotics	0.60% **	0.05	0.15%	0.02
Percent with any use of second-generation antipsychotics	0.15% **	0.02	1.06%	0.06

Source: Author's calculations using the MEPS data (20); population rates have not been adjusted for covariates;

* chi-square test significant at $p<0.05$

** $p<0.01$

Table 2

Characteristics of Antipsychotic use and spending (weighted)

Variable	1996–97		2004–05	
	means/percent	Linearized Standard Error	means/percent	Linearized Standard Error
Average Medication use and spending characteristics				
Average number of defined daily dose units for users	143.7	24.1	114.8	10.3
Average number of unique medication categories other than antipsychotics (Multum)	3.3*	0.1	4.1	0.1
Average number of antipsychotic prescriptions in year (including refills)	7.0	0.4	6.9	0.2
Average number of antipsychotic prescriptions paid by:				
Medicaid	3.0	0.4	2.8	0.2
Private insurance	1.3	0.2	1.4	0.1
Self/family	5.2	0.4	5.0	0.2
Mean annual antipsychotic expenditures per person (2005 dollars)	$550**	56	$1344	93
Mean total health care expenditures	$8442**	729	$11,845	793
Aggregate estimates				
Total spending on outpatient antipsychotics (millions of 2005 dollars)	$1065.2	145	$4625.0	441.5
Total percent of outpatient antipsychotic drug expenditures paid by:				
Medicaid	36.2%	3.3	34.9%	2.3
private insurance	18.3%	2.5	21.8%	1.9
Self/Family	41.0%	2.7	37.3%	2.3
Unweighted number of antipsychotic users	415		809	
Weighted number of antipsychotic users	3,875,649		6,884,724	

Source: Author's calculations using the MEPS data (20)

* chi-square tests for discrete variables or t-tests for continuous variables were significant at $p<0.05$

** $p<0.01$

Appendix Table 1

DDD for antipsychotics mentioned in the MEPS data (source: WHO)

ATC	Drug Name	Daily Dose
N05AA01	Chlorpromazine	300 mg
N05AB02	Fluphenazine	10 mg
N05AB03	Perphenazine	30 mg
N05AB06	Trifluoperazine	20 mg
N05AC02	Thioridazine	300 mg
N05AC03	Mesoridazine	200 mg
N05AD01	Haloperidol	8 mg
N05AE02	Molindone	50 mg
N05AE04	Ziprasidone	80 mg
N05AF04	Thiothixene	30 mg
N05AH01	Loxapine	100 mg
N05AH02	Clozapine	300 mg
N05AH03	Olanzapine	10 mg
N05AH04	Quetiapine	400 mg
N05AX08	Risperidone	5 mg
N05AX12	Aripiprazole	15 mg

Appendix Table 2

Characteristics of Antipsychotic users and rates of antipsychotic use

Variable	1996–97		2004–05	
	Mean/percent	Linearized Standard Error	Mean/percent	Linearized Standard Error
Demographics, Income, and Insurance characteristics				
Age	48.7 **	1.6	42.7	1.1
Age groups				
Children (under 18)				
Percent of Antipsychotic Users	6.9% ++	1.7	14.7%	1.6
Rate of Antipsychotic Use	0.2% ++	0.05	0.7%	0.08
	[n=39]			
Non-elderly adults (18–64)				
Percent of Antipsychotic Users	66.5%	3.4	69.4%	2.5
Rate of Antipsychotic Use	0.8% **	0.07	1.3%	0.09
Elderly (65 and over)				
Percent of Antipsychotic Users	22.9% *	3.3	14.2%	1.9
Rate of Antipsychotic Use	1.4%	0.2	1.4%	0.2
	[n=85]			
Female				
Percent of Antipsychotic Users	54.7%	3.5	54.6%	2.5
Rate of Antipsychotic Use	0.8% **	0.08	1.3%	0.08
Hispanic Ethnicity				
Percent of Antipsychotic Users	7.9%	1.7	10.9%	1.7
Rate of Antipsychotic Use	0.5% *	0.1	0.9	0.1
	[n=64]			
Racial categories				
White				
Percent of Antipsychotic Users	80.5%	2.7	75.6%	2.5
Rate of Antipsychotic Use	0.7% **	0.06	1.1%	0.07
Black				
Percent of Antipsychotic Users	18.4%	2.7	16.5%	2.0
Rate of Antipsychotic Use	1.0% *	0.1	1.5%	0.2
	[n=90]			
Insurance Status				
Any private insurance during Year				
Percent of Antipsychotic Users	41.3%	3.8	42.2%	2.3
Rate of Antipsychotic Use	0.4 **	0.05	0.7%	0.06

Variable	1996–97		2004–05	
Any Medicare coverage during Year				
Percent of Antipsychotic Users	42.6%	3.7	35.6%	2.7
Rate of Antipsychotic Use	2.2%	0.3	2.9%	0.3
Any Medicaid coverage during Year				
Percent of Antipsychotic Users	46.9%	3.9	45.6%	2.6
Rate of Antipsychotic Use	2.7%	0.3	3.4%	0.2
Family Income less than 200% of the Federal Poverty Level				
Percent of Antipsychotic Users	58.1%	3.4	54.6%	2.6
Rate of Antipsychotic Use	1.3%**	0.1	2.0%	0.1
Percent with labor market participation in year				
Percent of Antipsychotic Users	29.8%	3.1	31.5%	2.6
Rate of Antipsychotic Use	0.4%**	0.05	0.7%	0.07
Selected On- and Off-Label conditions reported in year				
Potential on-label users, self-reported diagnosis in year				
Schizophrenia				
Percent of Antipsychotic Users	19.3%	2.9	14.1%	1.9
Rate of Antipsychotic Use	85.9%	4.6	90.0%	4.3
	[n=80]			
296 Affective disorders (without schizophrenia)				
Percent of Antipsychotic Users	8.2%++	1.9	21.7%	2.1
Rate of Antipsychotic Use	18.1%++	4.1	34.5%	3.0
	[n=38]			
Potential off-label users, self-reported diagnosis in year				
Anxiety disorders (without 296 affective disorders or schizophrenia)				
Percent of Antipsychotic Users	17.9%	2.2	18.8%	2.0
Rate of Antipsychotic Use	5.4%	0.7	4.5%	0.5
	[n=77]			
Unweighted number of antipsychotic users	415		809	
Weighted number of antipsychotic users	3,875,649		6,884,724	

Source: Author's calculations using the MEPS data (20). The first line of each cell gives the percent of each characteristics among antispsychotic users (column percentages), whereas the rates of antipsychotic use in each subpopulation (row percentages) are given in parentheses. Cell sizes of less than 100 unweighted observations are indicated in square brackets.

[+] In 2006–7, multiple racial categories were allowed; in these years white and black both indicate no other categories were recorded.

[++] formal statistical tests are not reported due to small cell sizes, estimates should be considered descriptive only;

[*] chi-square tests for discrete variables or t-tests for continuous variables were significant at $p<0.05$

[**] $p<0.01$